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(54) **METHOD AND APPARATUS FOR GENERATING TWO-DIMENSIONAL CODE PICTURE HAVING DYNAMIC EFFECT**

(57) Disclosed are a method and apparatus for generating a two-dimensional code picture having a dynamic effect. The method comprises: receiving a target character string, and encoding the target character string into a two-dimensional code sequence; acquiring a feature position in the two-dimensional code sequence, and calculating a relative coordinate of the feature position in a two-dimensional code specification matrix; acquiring a pre-set drawing area, and mapping the feature position into a feature area in the drawing area according to the relative coordinate of the feature position in the two-dimensional code specification matrix; drawing a dynamic picture in the drawing area according to a pre-set animation effect definition by means of a canvas assembly; and an image frame of the dynamic picture when an animation effect is ended or periodically ended being: an image frame of a pixel point taking a feature area filling grey value as a standard grey value corresponding to the feature position. Thus, the efficiency of manufacturing a dynamic two-dimensional code picture can be improved, and the convenience of operation is improved.

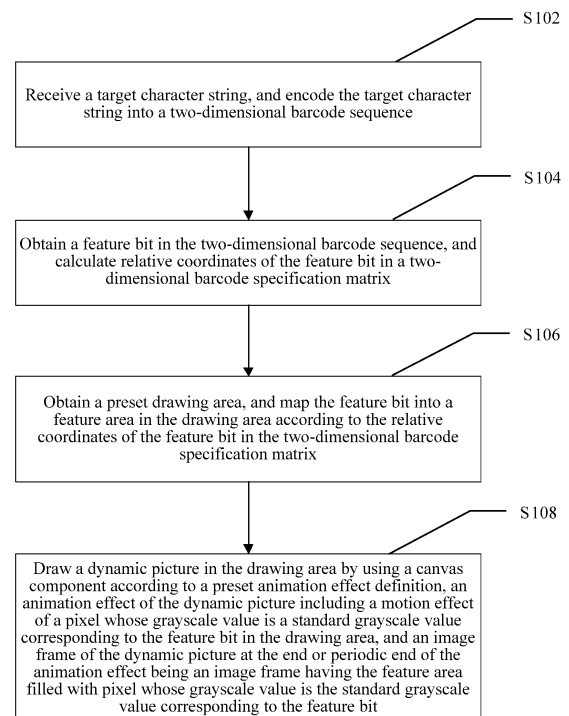


FIG. 1

Description**RELATED APPLICATION**

[0001] This application claims priority to Chinese Patent Application No. 201610309494.0, entitled "DATA REPORTING METHOD AND DEVICE", filed on May 10, 2016, both of which are incorporated herein by reference in their entirety.

FIELD OF THE TECHNOLOGY

[0002] The present application relates to the field of computer technologies, and in particular, to a method and an apparatus for generating a two-dimensional barcode picture having a dynamic effect.

BACKGROUND OF THE DISCLOSURE

[0003] A two-dimensional barcode picture in the existing technology is usually a black-and-white binary picture. During recognition of a two-dimensional barcode picture, grayscale values of pixels in corresponding positions are determined to perform parsing to obtain a character string corresponding to the two-dimensional barcode picture. However, black-and-white two-dimensional barcode pictures usually have unvaried visual effect.

[0004] For better user experience, to provide a two-dimensional barcode picture with a better visual effect, a two-dimensional barcode picture having a dynamic effect further emerges in the existing technology. However, in the conventional technology, a two-dimensional barcode picture having a dynamic effect needs to be manually manufactured. A user needs to first use image editing and processing software such as Photoshop to extract a black area part in a static black-and-white two-dimensional barcode picture (if a light-color GIF picture is chosen as a background image in a drawing area, and correspondingly, extract a white area part if the background image is a dark-color GIF picture) and then manually sets the movement of black dots to form an animation effect.

SUMMARY

[0005] To resolve the problems of low manufacturing efficiency and inconvenience because a user needs to perform manual operations to manufacture a two-dimensional barcode picture having a dynamic effect in the conventional technology, a method for generating a two-dimensional barcode picture having a dynamic effect may be provided.

[0006] A method for generating a two-dimensional barcode picture having a dynamic effect, performed by a computing device including a processor and a memory, the memory storing instructions capable of being executed by the processor, and the method including:

receiving a target character string, and encoding the target character string into a two-dimensional barcode sequence;

obtaining a feature bit in the two-dimensional barcode sequence, and calculating relative coordinates of the feature bit in a two-dimensional barcode specification matrix;

obtaining a preset drawing area, and mapping the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and

drawing a dynamic picture in the drawing area by using a canvas component according to a preset animation effect definition, an animation effect of the dynamic picture including a motion effect of a pixel whose grayscale value is a standard grayscale value corresponding to the feature bit in the drawing area, and an image frame of the dynamic picture at the end or periodic end of the animation effect being an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0007] An apparatus for generating a two-dimensional barcode picture having a dynamic effect includes: a processor and a memory, the memory storing computer readable instructions that cause the processor to perform the following operations:

a module for generating a two-dimensional barcode, configured to receive a target character string, and encode the target character string into a two-dimensional barcode sequence;

a module for obtaining coordinates of a feature bit, configured to obtain a feature bit in the two-dimensional barcode sequence, and calculate relative coordinates of the feature bit in a two-dimensional barcode specification matrix;

a module for performing mapping into a feature area, configured to obtain a preset drawing area, and map the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and

a module for drawing a dynamic image, configured to draw a dynamic picture in the drawing area by using a canvas component according to a preset animation effect definition,

an animation effect of the dynamic picture including a motion effect of a pixel whose grayscale value is

a standard grayscale value corresponding to the feature bit in the drawing area, and

an image frame of the dynamic picture at the end or periodic end of the animation effect being an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0008] A computer readable storage medium stores computer readable instructions, the computer readable instructions causing one or more processors to perform the following operations:

receiving a target character string, and encoding the target character string into a two-dimensional barcode sequence;

obtaining a feature bit in the two-dimensional barcode sequence, and calculating relative coordinates of the feature bit in a two-dimensional barcode specification matrix;

obtaining a preset drawing area, and mapping the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and

drawing a dynamic picture in the drawing area by using a canvas component according to a preset animation effect definition, an animation effect of the dynamic picture including a motion effect of a pixel whose grayscale value is a standard grayscale value corresponding to the feature bit in the drawing area, and an image frame of the dynamic picture at the end or periodic end of the animation effect being an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0009] After the foregoing method and apparatus for generating a two-dimensional barcode picture having a dynamic effect are used, when manufacturing a two-dimensional barcode picture having a dynamic effect, a user only needs to first input a target character string that needs to be encoded, then set the position and size of a drawing area, and define an animation effect of pixels before a terminal can automatically output a two-dimensional barcode picture having a dynamic effect. The user does not need to use image editing software to first extract a feature part in a two-dimensional barcode picture and then manually draw a two-dimensional barcode picture frame by frame, so that the manufacturing efficiency is greatly improved and the convenience of operations is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] To describe the technical solutions of the embodiments of the present application or the existing technology more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the existing technology. Apparently, the accompanying drawings in the following description show only some embodiments of the present application, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a flowchart of a method for generating a two-dimensional barcode picture having a dynamic effect according to an embodiment;

FIG. 2 is schematic diagram of content in areas of a two-dimensional barcode image matrix defined in a QR code;

FIG. 3 is a diagram of mapping between bits in a two-dimensional barcode sequence defined in a QR code and dots in a two-dimensional barcode image matrix;

FIG. 4 is an interface diagram presenting a dynamic two-dimensional barcode picture having a fly-in or fly-out effect according to an embodiment;

FIG. 5 is a schematic structural diagram of an apparatus for generating a two-dimensional barcode picture having a dynamic effect according to an embodiment; and

FIG. 6 is a schematic structural diagram of a computer device running the foregoing method for generating a two-dimensional barcode picture having a dynamic effect according to an embodiment.

DESCRIPTION OF EMBODIMENTS

[0011] The technical solutions in the embodiments of the present application will be clearly and completely described in the following with reference to the accompanying drawings. It is obvious that the embodiments to be described are only a part rather than all of the embodiments of the present application. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present application without creative efforts shall fall within the protection scope of the present application.

[0012] In some embodiments, a method for generating a two-dimensional barcode picture having a dynamic effect is provided. In some examples, the method may be computer implemented and computer logic may be run on a computer system, such as a computer system based on a Von Neumann system. The computer logic may gen-

erate a two-dimensional barcode picture or a plug-in for generating a two-dimensional barcode picture in an application program. In some examples, the computer system may be a terminal device such as a smart phone, a tablet computer, and/or a notebook computer.

[0013] When the method is performed, a user may input a target character string, selects and sets the position and size of a drawing area, selects an animation effect (a developer may set in advance a plurality of animation effect definitions, for example, a shutter special effect, a fly-in special effect and a fly-out special effect, and a vortex special effect, and the user selects one of the animation effects), and then clicks a generation button before a terminal can automatically generate a two-dimensional barcode picture having a dynamic effect. Therefore, the efficiency of manufacturing a two-dimensional barcode picture having a dynamic effect is improved and the convenience of operations is improved.

[0014] In some examples, as shown in FIG. 1, the method for generating a two-dimensional barcode picture having a dynamic effect includes:

[0015] Step S102: Receive a target character string, and encode the target character string into a two-dimensional barcode sequence.

[0016] Step S104: Obtain a feature bit in the two-dimensional barcode sequence, and search for relative coordinates of the feature bit in a two-dimensional barcode specification matrix.

[0017] Step S106: Obtain a preset drawing area, and map the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

[0018] Step S108: Draw a dynamic picture in the drawing area by using a canvas component according to a preset animation effect definition. An animation effect of the dynamic picture, for example, including a motion effect of a pixel whose grayscale value is a standard grayscale value corresponding to the feature bit in the drawing area, and an image frame of the dynamic picture at the end or periodic end of the animation effect being an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0019] A two-dimensional barcode cleverly uses in coding the concept of bit streams of "0" and "1" that form the internal logic basis of computers. Several geometric shapes corresponding to the binary system are used to represent text and numerical value information. An image input device or an optoelectronic scanning device is used to perform automatic recognition and reading to implement automatic information processing. Among various types of two-dimensional barcodes, common code systems include Data Matrix, MaxiCode, Aztec, QR Code, Vericode, PDF417, Ultracode, Code 49, Code 16K, and the like.

[0020] The encoding of QR Code is used as an example. A process of generating a two-dimensional barcode picture of QR Code is as follows: First, each character

(number, letter, symbol, or the like) in a target character string is converted into a binary sequence (for example, a sequence 0101). Binary sequences of characters are then connected. A start bit and an end bit are added to reach the length of a two-dimensional barcode sequence to obtain the two-dimensional barcode sequence. A picture is then generated according to the two-dimensional barcode sequence. A bit 1 in the sequence is black in the picture, and a bit 0 in the sequence is white in the picture. For example, a character string "ABCDE123" is encoded into a two-dimensional barcode sequence:

00100000 01000001 11001101 01000101 00101001
11011100 00101110 10000000 11101100

[0021] A feature bit in a two-dimensional barcode sequence is a bit corresponding to a same grayscale value chosen in advance in the two-dimensional barcode sequence. In the foregoing example, if a chosen color used to represent a two-dimensional barcode feature is black and a used background of a drawing area is a light-color image, all bits 1 in the sequence are feature bits. If a chosen color used to represent a two-dimensional barcode feature is white and a used background of a drawing area is a dark-color image, all bits 0 in the sequence are feature bits.

[0022] In the example that the feature bits are all bits whose value is 1, to obtain relative coordinates of a feature bit 1 in a two-dimensional barcode specification matrix is to obtain relative coordinates of all black dots in the two-dimensional barcode image corresponding to the two-dimensional barcode.

[0023] In this embodiment, the two-dimensional barcode sequence may be converted, according to a two-dimensional barcode image standard, into a two-dimensional array satisfying the two-dimensional barcode specification matrix; and a subscript of the feature bit in the two-dimensional barcode sequence in the two-dimensional array is calculated as the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

[0024] As shown in FIG. 2 and FIG. 3, FIG. 2 and FIG. 3 show an example in which a static two-dimensional barcode picture generated by using the encoding of QR code. QR code symbols have a total of 40 specifications of matrices (which are generally black and white) that range from 21x21 (Version 1) to 177x177 (Version 40). The symbols in each version have four more modules on each side than those in an earlier version. A specification matrix defined in QR code symbols is stored by using a two-dimensional array. In this example, a two-dimensional barcode sequence is first converted into a two-dimensional barcode specification matrix (for example, converted into a 21x21 matrix if Version 1 is used) according to the specifications of QR code. The value of each element in the two-dimensional barcode specification matrix is set according to the value of each bit in the two-dimensional barcode sequence. That is, a bit in the two-dimensional barcode sequence is mapped into one dot in the two-dimensional barcode specification matrix. When the

feature bit is chosen to be the value 1, relative coordinates of all dots whose value is 1 in the generated two-dimensional barcode specification matrix may be obtained. The data structure of the storage of the two-dimensional barcode specification matrix in the computer system is that each dot in the two-dimensional barcode specification matrix of the two-dimensional array corresponds to each element in the two-dimensional array. When subscripts (including a horizontal-axis subscript and a vertical-axis subscript of the two-dimensional array) of an element whose value is 1 in the two-dimensional array are obtained, the relative coordinates of the feature bit in the two-dimensional barcode specification matrix are obtained.

[0025] In addition, it may further be automatically set whether the feature bit uses a bit whose value is 1 or a bit whose value is 0. Specifically, a grayscale mean value of background pixels in the drawing area may be obtained, and the feature bit may be determined according to the grayscale mean value of the background pixels in the drawing area.

[0026] For example, if the background of the drawing area has a light color after a user inputs a target character string, a terminal analyzes the light-color background image and determines that a grayscale mean value of the background image is large or is greater than a preset value. In this case, bits whose value is 1 may be selected as the feature bit to increase the contrast between the feature bit and the dynamic background image. Correspondingly, if the background of the drawing area has a dark color after the user inputs a target character string, the terminal analyzes the dark-color background image and determines that a grayscale mean value of the background image is small or is less than a preset value, a large grayscale value may be set for the feature bit to increase the contrast between the feature bit and the background of the drawing area.

[0027] In this manner, the value of a feature bit may first be automatically set according to a dynamic background image, to provide high contrast between a recognition element in a two-dimensional barcode picture and the background of the drawing area, making an eventually generated two-dimensional barcode picture more recognizable. Moreover, the user may be relieved from setting a feature bit (that is, select a bit whose value is 1 as the feature bit or a bit whose value is 0 as the feature bit), so that the convenience of operations is improved.

[0028] In step S106, a scale factor of the drawing area relative to the two-dimensional barcode specification matrix may be obtained; the relative coordinates in the two-dimensional barcode specification matrix are mapped into an area in the drawing area according to the scale factor; and a search is made for the area corresponding to the relative coordinates of the feature bit as the feature area.

[0029] For example, if a specification matrix is a 21X21 two-dimensional array:

	1	0	...	1
	0	0	...	0
	...	...	...	...
5	1	1	...	1

[0030] Relative coordinates of feature bits may be recorded to be:

10 (0, 0) ... (20, 0) ... (0, 20), (1, 20), ... (20, 20)

[0031] The size of a dynamic background image is 105X105. A scale factor of the dynamic background image relative to a two-dimensional barcode specification matrix is 5 (5 in both the horizontal direction and the vertical direction). In this case, 5X5 pixels may be used as a unit in the dynamic background image to divide the area in which the dynamic background image is located into 21X21 areas. An area into which relative coordinates of a feature bit is mapped is a feature area. For example, the following pixel matrix presents a mapping relationship between the feature bit and the feature area:

	1	1	1	1	1			
	1	1	1	1	1			
25	1	1	1	1	1	0	...	1
	1	1	1	1	1			
	1	1	1	1	1			
			0			0	...	0
			...			...	...	...
30			1			1	...	1

[0032] The foregoing recorded relative coordinates (0, 0) ... (20, 0) ... (0, 20), (1, 20), ... (20, 20) of the feature bits are mapped into a special area in the dynamic background image according to formulas:

pixel coordinates of an upper-left corner vertex of the special area = the relative coordinates $\times$ the scale factor; and

pixel coordinates of a lower-right corner vertex of the special area = the relative coordinates $\times$ the scale factor +4.

[0033] In this way, area coordinates of pixels that are set as special areas in the corresponding dynamic background image are obtained:

[(0, 0), (4, 4)], ... [(100, 0), (104, 4)], ... [(0, 100), (4, 104)], [(5, 100), (9, 104)], [(100, 100), (104, 104)]

[0034] In step S108, an image may be drawn frame by frame in the drawing area by using the canvas component. The positions of the pixels are changed in each frame to generate an animation special effect of a motion effect. Eventually, the feature area is filled with a pixel whose grayscale values are the standard grayscale value corresponding to the feature bit.

[0035] As shown in FIG. 4, in an application scenario in which an animation effect definition is a fly-in or fly-out

effect, an animation effect of a two-dimensional barcode picture flying in the drawing area from left to right is presented. The form of an image that may be presented when the animation effect ends or periodically ends (the animation effect is a periodically played effect, and the animation effect is played repeatedly at a next moment at the periodic end) is defined in the feature area. That is, the canvas component is used to draw, in the feature area in the image frame at the end or periodic end of the animation effect, pixel whose grayscale value is the standard grayscale value corresponding to the feature bit. During the presentation of the animation effect, the pixel whose grayscale value is the standard grayscale value corresponding to the feature bit may be selectively drawn according to the definition of the animation effect in a partial area by using the canvas component, and the positions of the pixels are changed frame by frame to enable the pixels to generate a motion effect. However, eventually, when the animation ends or periodically ends, the pixel whose grayscale value is the standard grayscale value corresponding to the feature bit may be drawn in the feature area.

[0036] A developer may provide the animation effect definitions in advance for subsequent selection by a user who manufactures a two-dimensional barcode picture having a dynamic effect. For example, the developer may define various animation effect definitions such as fly-in or fly-out, shutter, fade-in or fade-out, scale, overturn, rotate, ripple, dissolve or flicker in advance. The user may select a corresponding animation effect definition before a two-dimensional barcode picture having a corresponding animation special effect can be generated.

[0037] In this embodiment, the background of the drawing area may be a dynamic picture background in a gif format. When a canvas control is used to draw a picture on a page, the dynamic picture background is always drawn in a specified area frame by frame. Therefore, the standard grayscale value corresponding to the feature bit may be drawn in each frame of a dynamic background image according to an animation effect definition by using the canvas component. In some examples, the canvas component may be a canvas component defined in the HTML5 standard.

[0038] In this embodiment, after a two-dimensional barcode picture having a dynamic effect is generated, the two-dimensional barcode picture may be stored in the form of a gif picture and added to a web page or an application page for presentation. A user uses a camera on a mobile phone to scan the two-dimensional barcode picture when the animation effect ends or periodic ends. In this case, the presented image frame is an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit. Therefore, the standard grayscale values of the feature area are all recognized to be 1 or 0. Background colors in a non-feature area are all recognized to be 0 or 1. Therefore, a corresponding character string can be recognized.

[0039] If the user intends to recognize the two-dimensional barcode picture on the terminal that presents the two-dimensional barcode picture having a dynamic effect, the user still can perform a long press on the two-dimensional barcode picture having a dynamic effect to trigger a recognition operation. The terminal then detects a long press operation on a display area in which the generated two-dimensional barcode picture having the dynamic effect is located; and generates a cover layer on top of the two-dimensional barcode picture having a dynamic effect by using the canvas component, and draws, by using the canvas component on the cover layer, the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0040] For example, if an event that the user makes a long press on an area in which the two-dimensional barcode picture is located is detected, a cover layer is generated in an area in which the dynamic two-dimensional barcode picture is located on a display interface, and the cover layer is on top of the dynamic two-dimensional barcode picture (for example, on a webpage, a div label may be used to define one cover layer, and it is defined that the cover layer is on top of the div label in which the dynamic two-dimensional barcode picture is located). The size of the cover layer may be set to be identical with the size of the dynamic two-dimensional barcode picture, and the content in the cover layer is drawn to be the feature area that is completely filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit. In this way, when a program for recognizing a two-dimensional barcode picture on the terminal obtains a picture for recognizing a two-dimensional barcode, the terminal uses the static picture having the feature area that is completely filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit instead of an entire dynamic two-dimensional barcode picture. Therefore, two-dimensional barcode information can be recognized by using the distribution of the standard grayscale value in the feature area in the static picture (in the foregoing scenario in which another terminal scans a two-dimensional barcode to perform recognition, because an image frame that is at the end or periodic end of a dynamic two-dimensional barcode image and is presented at a scanning moment is obtained during a scan, an operation of presenting a cover layer is may not be performed).

[0041] Furthermore, the terminal further detects a touch release operation on the display area in which the generated two-dimensional barcode picture having a dynamic effect is located, removes the cover layer, and restores presentation of the generated two-dimensional barcode picture having a dynamic effect.

[0042] That is, when a user makes a long press on a dynamic two-dimensional barcode picture, because a cover layer is located on top of the dynamic two-dimensional barcode picture, and the content in the cover layer is kept to be a static picture having the feature area that

is completely filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit. Therefore, an image frame that is observed by the user by using the display interface and is presented in an area in which the dynamic two-dimensional barcode picture is located is kept to be the static picture having the feature area that is completely filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit. For the user, an effect that a dynamic two-dimensional barcode picture is paused and stops is achieved. When a finger of the user leaves a display interface and a touch release operation is triggered, because the cover layer is removed (canceled or set to be transparent), the content presented to the user is restored to the original dynamic two-dimensional barcode picture under the cover layer, for the user, an effect that the two-dimensional barcode picture restores movement from the pause and stop is achieved.

[0043] Some embodiments provide an apparatus for generating a two-dimensional barcode picture having a dynamic effect. As shown in FIG. 5, the foregoing apparatus for generating a two-dimensional barcode picture having a dynamic effect includes a module 102 for generating a two-dimensional barcode, a module 104 for obtaining coordinates of a feature bit, a module 106 for performing mapping into a feature area, and a module 108 for drawing a dynamic image.

[0044] The module 102 for generating a two-dimensional barcode is configured to receive a target character string, and encode the target character string into a two-dimensional barcode sequence.

[0045] The module 104 for obtaining coordinates of a feature bit is configured to obtain a feature bit in the two-dimensional barcode sequence, and calculate relative coordinates of the feature bit in a two-dimensional barcode specification matrix.

[0046] The module 106 for performing mapping into a feature area is configured to obtain a preset drawing area, and map the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

[0047] The module 108 for drawing a dynamic image is configured to draw a dynamic picture in the drawing area by using a canvas component according to a preset animation effect definition.

[0048] An animation effect of the dynamic picture including a motion effect of a pixel whose grayscale value is a standard grayscale value corresponding to the feature bit in the drawing area.

[0049] An image frame of the dynamic picture at the end or periodic end of the animation effect being an image frame having the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0050] In some examples, in one of the embodiments, the module 104 for obtaining coordinates of a feature bit is further configured to convert, according to a two-dimensional barcode image standard, the two-dimensional

barcode sequence into a two-dimensional array satisfying the two-dimensional barcode specification matrix; and calculate a subscript of the feature bit in the two-dimensional barcode sequence in the two-dimensional array as the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

[0051] In some examples, in one of the embodiments, the module 106 for performing mapping into a feature area is further configured to obtain a scale factor of the drawing area relative to the two-dimensional barcode specification matrix; map the relative coordinates in the two-dimensional barcode specification matrix into an area in the drawing area according to the scale factor; and search for the area corresponding to the relative coordinates of the feature bit as the feature area.

[0052] In some examples, in one of the embodiments, the module 104 for obtaining coordinates of a feature bit is further configured to obtain a grayscale mean value of background pixels in the drawing area, and determine the feature bit according to the grayscale mean value of the background pixels in the drawing area.

[0053] In some examples, in one of the embodiments, as shown in FIG. 5, the foregoing apparatus further includes a module 110 for recognizing a two-dimensional barcode, configured to detect a long press operation on a display area in which the generated two-dimensional barcode picture having the dynamic effect is located; and generating a cover layer on top of the two-dimensional barcode picture having a dynamic effect by using the canvas component, and drawing, by using the canvas component on the cover layer, the feature area filled with a pixel whose grayscale value is the standard grayscale value corresponding to the feature bit.

[0054] In some examples, in one of the embodiments, the module 110 for recognizing a two-dimensional barcode is further configured to detect a touch release operation on the display area in which the generated two-dimensional barcode picture having a dynamic effect is located, remove the cover layer, and restore presentation of the generated two-dimensional barcode picture having a dynamic effect.

[0055] After the foregoing method and apparatus for generating a two-dimensional barcode picture having a dynamic effect are used, when manufacturing a two-dimensional barcode picture having a dynamic effect, a user may first input a target character string that may be encoded, then set the position and size of a drawing area, and define an animation effect of pixels before a terminal can automatically output a two-dimensional barcode picture having a dynamic effect. The user may be relieved from using image editing software to first extract a feature part in a two-dimensional barcode picture and then manually draw a two-dimensional barcode picture frame by frame, so that the manufacturing efficiency is greatly improved and the convenience of operations is improved.

[0056] FIG. 6 shows a terminal 10 which is a system for generating a two-dimensional barcode picture having a dynamic effect. In some examples, the system may be

based on a Von Neumann system. In some examples, the system may include a terminal device such as a smart phone, a tablet computer, a handheld computer, a notebook computer or a personal computer. Alternatively or in addition, the system may include an external input interface 1001, a processor 1002, a memory 1003, and an output interface 1004 that are connected through a system bus. In some examples, the external input interface 1001 may at least include a network interface 10012. The memory 1003 may include an external memory 10032 (for example, a hard disk, an optical disc or a floppy disk) and an internal memory 10034. The output interface 1004 may at least include a device such as a display screen 10042.

[0057] The methods described herein may performed by executing instructions. The instructions may be stored in a program file stored in the external memory 10032 of the system 10 based on a Von Neumann system. When the computer program is run, the program file may be loaded into the internal memory 10034 and then compiled into machine code, and the machine code is then transferred to the processor 1002 for execution, so as to perform the logic of the logical module 102 for generating a two-dimensional barcode, the module 104 for obtaining coordinates of a feature bit, the module 106 for performing mapping into a feature area, and/or the module 108 for drawing a dynamic image in the system 10 based on a Von Neumann system. When the foregoing method for generating a two-dimensional barcode picture having a dynamic effect is performed, input parameters are all received by using the external input interface 1001 and transferred to the memory 1003 for caching. The input parameters are then input in the processor 1002 for processing. Result data of processing is cached in the memory 1003 for subsequent processing or is transferred to the output interface 1004 for output.

[0058] The foregoing computer program includes machine readable instructions stored in a non-volatile storage medium. Therefore, the embodiments may alternatively be implemented as a software product. A non-volatile computer readable storage medium may be a memory disposed in an expansion board inserted in the computer or a memory disposed in an expansion unit connected to the computer. A CPU or the like installed on the expansion board or the expansion unit may perform some or all actual operations according to the instructions. The non-volatile computer readable storage medium includes a floppy disk, a hard disk, a magneto-optical disc, an optical disc (for example, a CD-ROM, a CD-R, a CD-RW, a DVD-ROM, a DVD-RAM, a DVD-RW, and a DVD+RW), a magnetic tape, a non-volatile memory card and a ROM. In some embodiments, program code may be downloaded from a server computer over a communications network.

[0059] What is disclosed above is merely an example of the embodiments of the present application, and certainly is not intended to limit the protection scope of the present application. Therefore, equivalent variations

made in accordance with the claims of the present application shall fall within the scope of the present application.

Claims

1. A method for generating a two-dimensional barcode picture having a dynamic effect, performed by a terminal device comprising a processor and a memory, the memory storing instructions capable of being executed by the processor, and the method comprising:

receiving a target character string, and encoding the target character string into a two-dimensional barcode sequence;
obtaining a feature bit included in the two-dimensional barcode sequence, and calculating relative coordinates of the feature bit in a two-dimensional barcode specification matrix;
obtaining a preset drawing area, and mapping the feature bit into a feature area in the drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and
drawing a dynamic picture having an animation effect in the preset drawing area by using a canvas component according to a preset animation effect definition, the animation effect of the dynamic picture comprising a motion effect of a pixel whose grayscale value is a standard grayscale value corresponding to the feature bit in the drawing area, wherein a target image frame of the dynamic picture at an end or a periodic end of the animation effect being an image frame having the feature area filled with pixels whose grayscale value is the standard grayscale value corresponding to the feature bit.

2. The method of claim 1, wherein the calculating relative coordinates of the feature bit in the two-dimensional barcode specification matrix comprises:

converting, according to a two-dimensional barcode image standard, the two-dimensional barcode sequence into a two-dimensional array based on the two-dimensional barcode specification matrix; and
calculating a subscript of the feature bit in the two-dimensional barcode sequence in the two-dimensional array as the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

3. The method of claim 1, wherein the obtaining a preset drawing area, and mapping the feature bit into the feature area in the preset drawing area according

to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix comprises:

- obtaining a scale factor of the preset drawing area relative to the two-dimensional barcode specification matrix; 5
 - mapping the relative coordinates in the two-dimensional barcode specification matrix into an area in the preset drawing area according to the scale factor; and 10
 - searching for the area corresponding to the relative coordinates of the feature bit as the feature area. 15
4. The method of claim 1, further comprising:
- obtaining a grayscale mean value of background pixels in the preset drawing area; and 20
 - determining the feature bit according to the grayscale mean value of the background pixels in the preset drawing area.
5. The method of any one of claims 1 to 4, further comprising: after the generating a two-dimensional barcode picture having a dynamic effect, 25
- detecting a long press operation on a display area in which the generated two-dimensional barcode picture having the dynamic effect is located; and
- generating a cover layer on top of the two-dimensional barcode picture having the dynamic effect by using the canvas component, and drawing, by using the canvas component on the cover layer, the feature area filled with a pixels whose grayscale value is the standard grayscale value corresponding to the feature bit. 30 35
6. The method of claim 5, further comprising: after presenting the target image frame on the cover layer, 40
- detecting a touch release operation on the display area in which the generated two-dimensional barcode picture having a dynamic effect is located; and
- removing the cover layer to restore animation of the generated two-dimensional barcode picture having the dynamic effect. 45
7. An apparatus for generating a two-dimensional barcode picture having a dynamic effect, comprising: a processor and a memory, the memory storing computer readable instructions that cause the processor to: 50
- receiving a target character string, and encoding the target character string into a two-dimensional barcode sequence; 55
 - obtain a feature bit included in the two-dimensional barcode sequence;
 - calculate relative coordinates of the feature bit

in a two-dimensional barcode specification matrix;

obtain a preset drawing area, and map the feature bit to a feature area included in a preset drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and

display a dynamic animation of a dynamic picture in the preset drawing area by using a canvas component according to a preset animation effect definition,

an animation effect of the dynamic picture comprising a motion effect of a pixel having a standard grayscale value corresponding to the feature bit in the drawing area, and

an image frame of the dynamic picture at an end or a periodic end of the animation effect being an image frame having the feature area filled with pixels having the standard grayscale value corresponding to the feature bit.

8. The apparatus of claim 7, wherein the instructions cause the processor to:

convert, according to a two-dimensional barcode image standard, the two-dimensional barcode sequence into a two-dimensional array satisfying the two-dimensional barcode specification matrix; and

calculate a subscript of the feature bit in the two-dimensional barcode sequence in the two-dimensional array as the relative coordinates of the feature bit based on the two-dimensional barcode specification matrix.

9. The apparatus of claim 7, wherein the computer readable instructions cause the processor to:

obtain a scale factor of the preset drawing area relative to the two-dimensional barcode specification matrix;

map the relative coordinates in the two-dimensional barcode specification matrix into an area in the preset drawing area according to the scale factor;

search for the area corresponding to the relative coordinates of the feature bit; and

set the feature area to the area.

10. The apparatus of claim 7, wherein the computer readable instructions cause the processor to:

obtain a grayscale mean value of background pixels in the preset drawing area; and

determine the feature bit according to the grayscale mean value of the background pixels in the preset drawing area.

11. The apparatus of any one of claims 7 to 10, wherein the instructions cause the processor to:

detect a long press operation on a display area in which the generated two-dimensional barcode picture having the dynamic effect is located; and
generate a cover layer on top of the two-dimensional barcode picture by using the canvas component; and
draw, by using the canvas component on the cover layer, the feature area filled with pixels having the standard grayscale value corresponding to the feature bit.

12. The apparatus of claim 11, wherein the instructions cause the processor to:

detect a touch release operation on the display area in which the generated two-dimensional barcode picture having the dynamic effect is located, remove the cover layer, and restore presentation of the generated two-dimensional barcode picture having a dynamic effect.

13. A non-transitory computer readable storage medium, storing computer readable instructions, the computer readable instructions causing one or more processors to:

receive a target character string, and encode the target character string into a two-dimensional barcode sequence;
obtain a feature bit included in the two-dimensional barcode sequence;
calculate relative coordinates of the feature bit in the two-dimensional barcode specification matrix;
obtain a preset drawing area, and map the feature bit into a feature area in a drawing area according to the relative coordinates of the feature bit in the two-dimensional barcode specification matrix; and
draw a dynamic picture having an animation effect in the drawing area by using a canvas component according to a preset animation effect definition, the animation effect of the dynamic picture comprising a motion effect of a pixel having a standard grayscale value corresponding to the feature bit in the drawing area, wherein a target image frame of the dynamic picture at an end or a periodic end of the animation effect is an image frame having the feature area filled with pixels whose grayscale value is the standard grayscale value corresponding to the feature bit.

14. The storage medium of claim 13, wherein the instructions further cause the one or more processors to:

convert, according to a two-dimensional barcode image standard, the two-dimensional barcode sequence into a two-dimensional array based on the two-dimensional barcode specification matrix; and

calculate a subscript of the feature bit in the two-dimensional barcode sequence in the two-dimensional array as the relative coordinates of the feature bit in the two-dimensional barcode specification matrix.

15. The storage medium of claim 13, wherein the computer readable instructions cause the one or more processors to:

obtain a scale factor of the drawing area relative to the two-dimensional barcode specification matrix;
map the relative coordinates in the two-dimensional barcode specification matrix into an area in the drawing area according to the scale factor; and
search for the area corresponding to the relative coordinates of the feature bit as the feature area.

16. The storage medium according to claim 13, wherein the computer readable instructions cause the one or more processors to perform the following operations: obtain a grayscale mean value of background pixels in the drawing area; and determine the feature bit according to the grayscale mean value of the background pixels in the drawing area.

17. The storage medium according to any one of claims 13 to 16, wherein the computer readable instructions cause the one or more processors to perform the following operations:

detect a long press operation on a display area in which the generated two-dimensional barcode picture having the dynamic effect is located; and
generate a cover layer on top of the two-dimensional barcode picture having a dynamic effect by using the canvas component, and drawing, by using the canvas component on the cover layer, the feature area filled with a pixels whose grayscale value is the standard grayscale value corresponding to the feature bit.

18. The storage medium according to claim 17, wherein the computer readable instructions cause the one or more processors to:

detect a touch release operation on the display area in which the generated two-dimensional barcode picture having a dynamic effect is located, and remove

the cover layer, and restoring presentation of the generated two-dimensional barcode picture having a dynamic effect.

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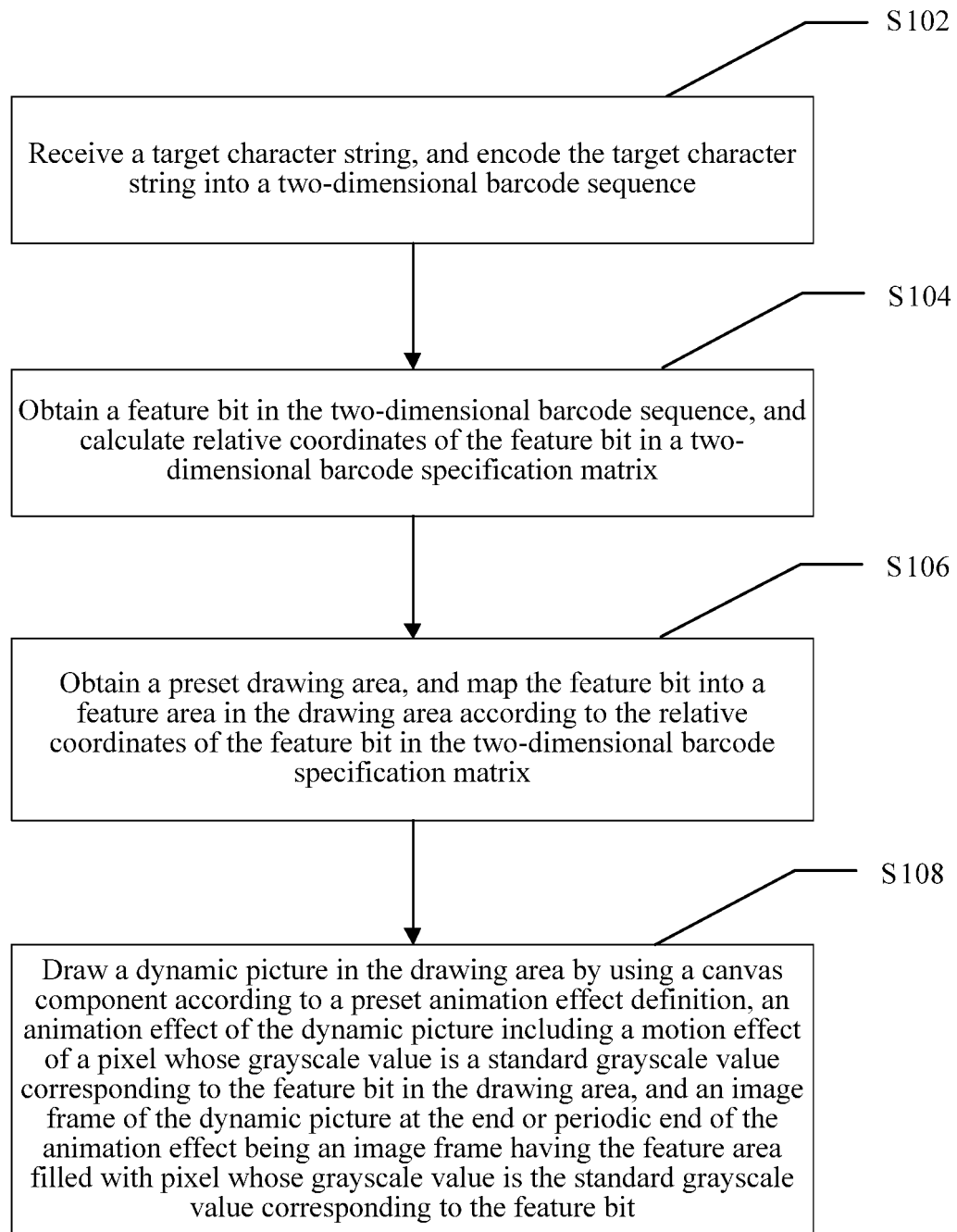


FIG. 1

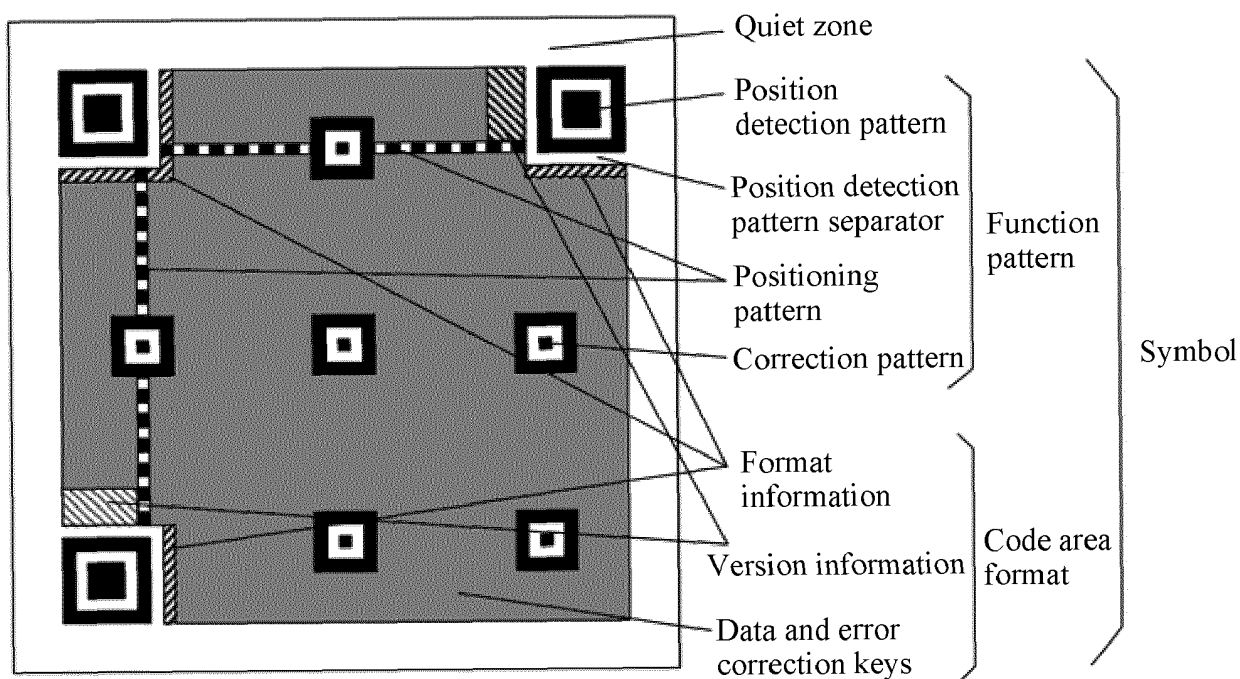


FIG. 2

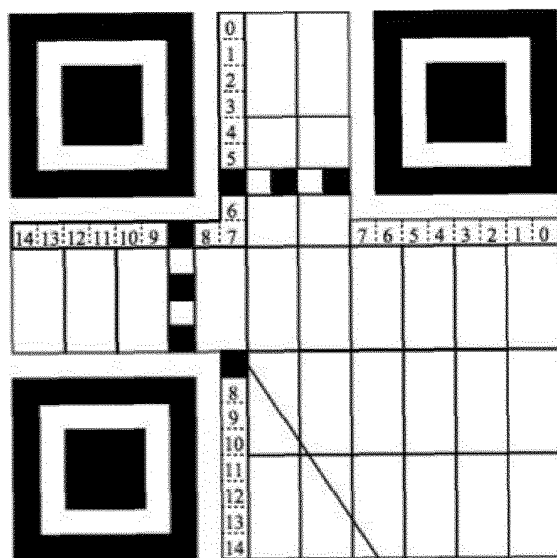
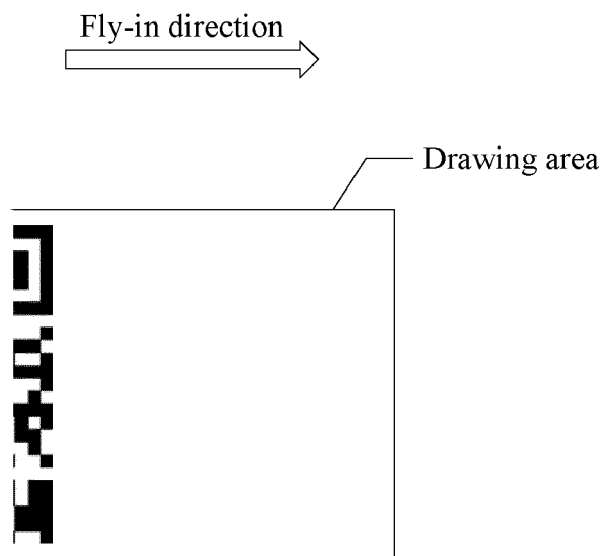
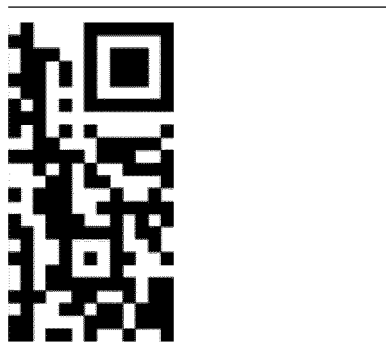


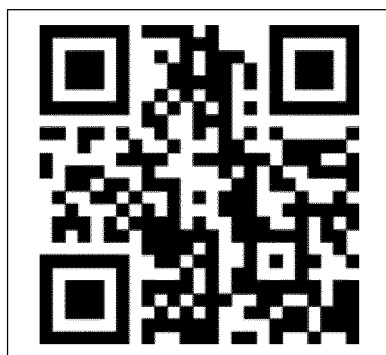
FIG. 3



The animation starts



A frame in the presentation
of an animation effect



A presented image at the
periodic end of the animation
effect

FIG. 4

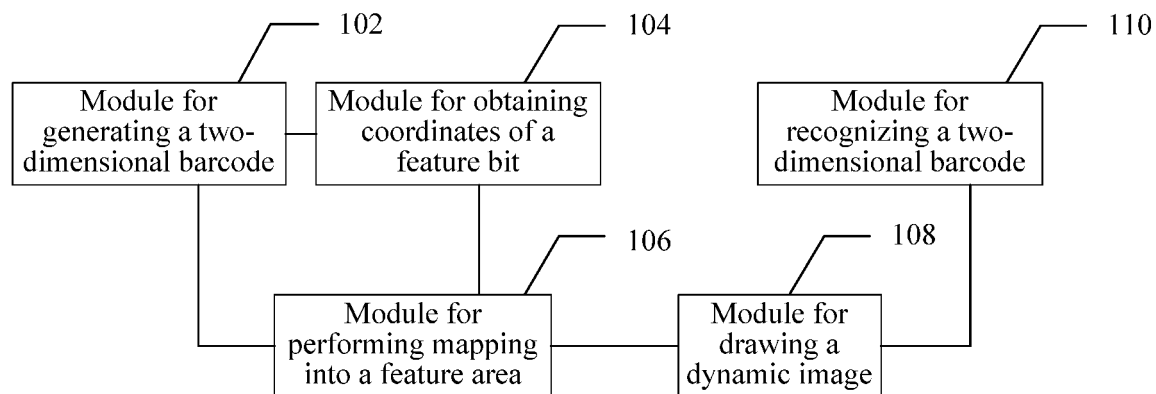


FIG. 5

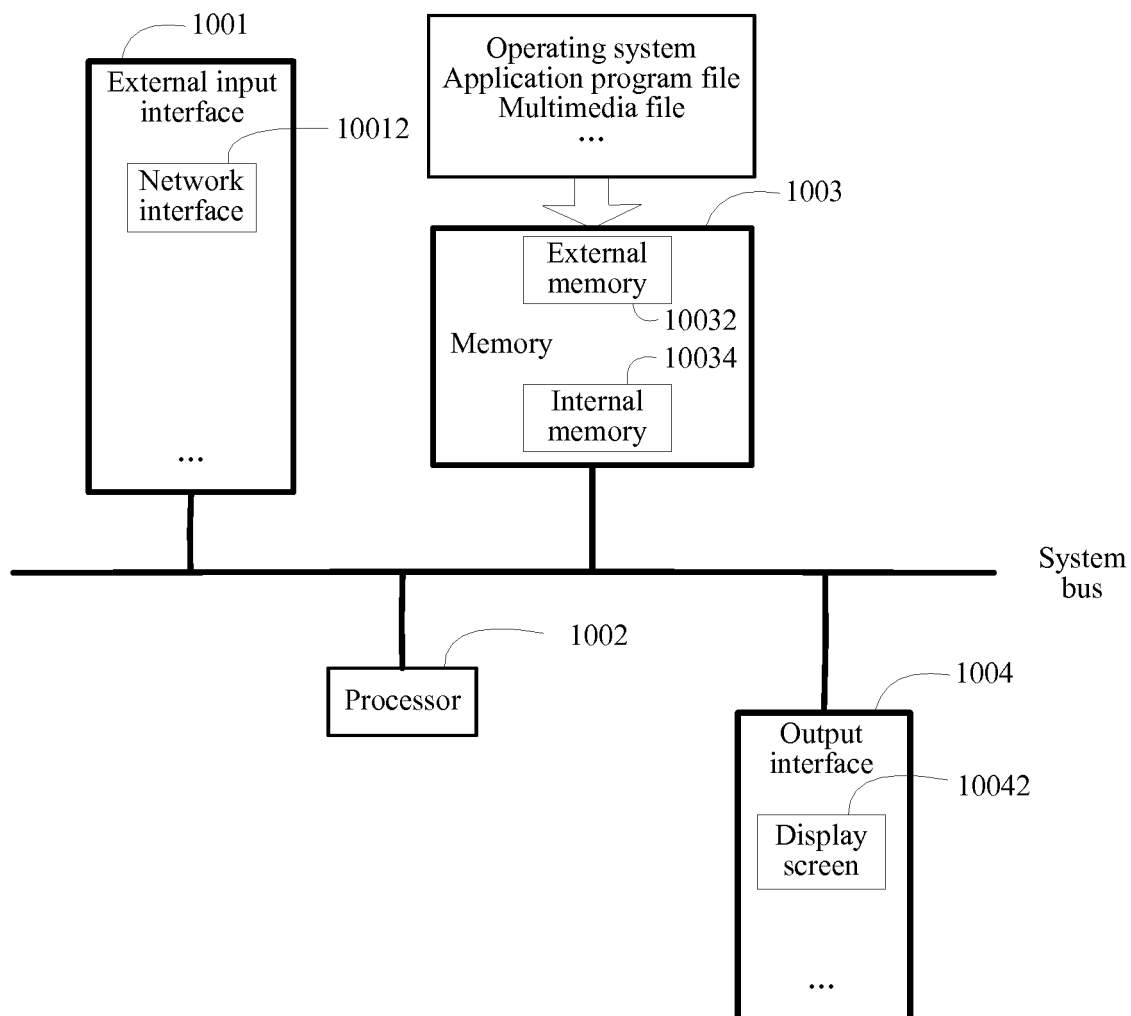


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/083449

A. CLASSIFICATION OF SUBJECT MATTER

G06K 19/06 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06K G06T H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, CNKI, EPODOC, WPI: two lw dimension+ w code?, two lw dimension+ w bar w code?, matrix, array, animat+, special w effect+, dynamic, pixel, motion, canvas

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 106022424 A (TENCENT TECHNOLOGY SHENZHEN CO., LTD.) 12 October 2016 (12.10.2016) claims 1-12, and description, paragraph [0092]	1-18
Y	CN 103473799 A (TENCENT TECHNOLOGY SHENZHEN CO., LTD.) 25 December 2013 (25.12.2013) description, paragraphs [0004]-[0008]	1-4, 7-10, 13-16
Y	CN 103870861 A (TENCENT TECHNOLOGY SHENZHEN CO., LTD.) 18 June 2014 (18.06.2014) description, paragraphs [0032] and [0033]	1-4, 7-10, 13-16
A	CN 104571887 A (BEIJING QIHOO TECHNOLOGY CO., LTD. et al.) 29 April 2015 (29.04.2015) the whole document	1-18
A	US 2015269466 A1 (CELLUM INNOVACIOS ES SZOLGALTATO ZRT.) 24 September 2015 (24.09.2015) the whole document	1-18

☐ Further documents are listed in the continuation of Box C.
☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 05 June 2017	Date of mailing of the international search report 27 June 2017
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer ZHANG, Wei Telephone No. (86-10) 62413228

INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International application No.
 PCT/CN2017/083449

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 106022424 A	12 October 2016	None	
CN 103473799 A	25 December 2013	WO 2015027953 A1	05 March 2015
CN 103870861 A	18 June 2014	None	
CN 104571887 A	29 April 2015	WO 2016107356 A1	07 July 2016
US 2015269466 A1	24 September 2015	WO 2015145334 A1	01 October 2015
		US 2016070923 A1	10 March 2016

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201610309494 [0001]